Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY **RESEARCH, DEVELOPMENT, TEST & EVALUATION, NAVY/BA 5**	R-1 ITEM NOMENCLATURE MINE DEVELOPMENT/0604601N

COST ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	2.294	.015	3.315	5.891	1.962	1.968	1.976	2.006	Continuing	Continuing
Mine Improvement Q0267	2.294	.015	3.315	5.891	1.962	1.968	1.976	2.006	Continuing	Continuing
Quantity of RDT&E Articles & cost	N/A	N/A	N/A	18/2.0	N/A	N/A	N/A	N/A		

- The above controls reflect USN dollars only. Additional program dollars are provided from the Royal Australian Navy (RAN) as well as funding approved under the Nunn Amendment, 10 USC 2350(a) as shown in paragraph C.

A. Mission Description and Budget Item Justification

(U) This non-acquisition project is the only R&D program for mine systems, and is the sole support for the capability to maintain the effectiveness of mines facing new threat targets and increasing emphasis on major regional conflicts and littoral warfare in shallow water. Project tasks are grouped into several areas: (1a) Threat Modeling/Analysis, which collects, analyzes, and develops digital models of data on current priority threat target characteristics to support computer simulations; (1b) Target Detection and Response, which uses target models to develop optimal mine designs, settings, and firing algorithms; (2a) Components/Subsystems, which develops upgrades of mine components to maintain effectiveness against current threat targets using proven state-of-the-art technology including a remote controlled mine capability (RECO); (2b) Advanced Power sources, which develops improved batteries without hazardous heavy metals, and (3) New mines, which designs and develops new mines, including an Improved Submarine-Launched Mobile Mine (ILSMM) and a Littoral Sea Mine (LSM). The Improved Submarine-Launched Mobile Mine is an ACAT III, International Cooperative R &D program with the RAN. The Mission Need Statement (MNS M044-85-93) for an Improved Submarine-Launched Mobile Mine (ISLMM) was approved on 13 December 1993. The MNS shows a Fleet need to have a covert mining capability and to eliminate reliability and obsolescence problems associated with the existing MK 67 SLMM. The ISLMM will be used to sustain and improve the USN covert mining capability by converting existing MK48 Torpedoes into dual warhead mines. It will feature: dual explosive sections (warheads); increased compatibility with SSN-688 class fire control systems; multiple-waypoint turn capability; greater range than the present MK 67 SLMM; and the advanced Target Detection Device (TDD) MK 71.

The ISLMM will be designed for launch from the following platforms:

SSN 688 Class Submarines
Seawolf Class Submarines
New SSN Class Submarines
Collins Class Submarines (RAN)

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The Littoral Sea Mine (LSM) is designed to replace the MK 56 moored mine which is in process of being removed from service inventory. A Mission Needs Statement for LSM (MNS M054-85-94) was approved in June 1994. The MNS identifies the requirement for a moored, wide-area-coverage mine as a replacement for the MK 56 mine against surface and submerged targets in littoral waters. The LSM will be used to extend the current US Navy mining capability beyond the shallow water regime filled by the Quickstrike family of bottom mines. The LSM will utilize existing hardware and technologies to a great extent in order to provide this capability to the Fleet as soon as possible. It will feature an advanced target detection subsystem (based on the TDD MK 71), an encapsulated mobile homing warhead (based on the MK 46 torpedo), and a remote control subsystem. The LSM is intended to be delivered by air, surface, and submarine platforms.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($1.170) Completed the development of the ACV algorithm and publish a final report. Continued the development of the DE/MS algorithm and began initial investigation of an algorithm specifically addressing remote control of mines. Coded firmware cartridge for the fast patrol boat algorithm. Continued to develop and generate actuation and damage operational data for fleet minefield planning for high priority targets.
- (U) ($1.024) Continued the development of a larger lithium cell. Completed preliminary designs of batteries using those cells. Completed development of MK-130 Mine battery using the AA lithium cell. Completed the development of the improved pressure sensor and test set for TDD MK-71.
- (U) ($ .100) Prepared requirements documentation for RECO, ILSMM and LSM.

2. (U) FY 1999 PLAN:

- (U) ($ .015) Program Management

3. (U) FY 2000 PLAN

- (U) ($. 852) Initiate design and development of a remote controlled mine (RECO) capability, including signal reception sensors and confirmation signal transmitters.
- (U) ($1.863) Initiate design, development and upgrade for the MK48-based Improved Submarine Launched Mobile Mine (ISLMM) EMD Demo prototype models, to include: Design and build the TDD interface, an exercise configuration, and control group modifications; and identify noise levels.
  Integrate a commercial off the shelf (COTS) control group computer.
  Redesign and build the speed control valve for fuel efficiency.
  Design and build a separation system for release of forward payload.
  Test and evaluate EMD models.
- (U) ($.100) Initiate Tactical Software Development for ISLMM.

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APPROPRIATION/BUDGET ACTIVITY **RESEARCH, DEVELOPMENT, TEST & EVALUATION, NAVY/BA 5**	R-1 ITEM NOMENCLATURE MINE DEVELOPMENT/0604601N

3. (U) FY 2000 PLAN: (Cont.)

- (U) ($.300) Initiate ISLMM test program
- (U) ($.200) Initiate Integrated Logistics Support tasks for ISLMM related to maintainability, reliability and sustainability.

B. Program Change Summary:

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget	2.270	.015	.852
Appropriated Value:	2.815	.015	
Adjustment to FY 1998 Appropriated Value/ FY 1999 President's Budget	- 0.521		+2.463
FY 2000 CONG Budget Submit	2.294	.015	3.315

Funding: FY 2000 decrease reflects general reductions ($0.037).

Schedule: See attached.

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APPROPRIATION/BUDGET ACTIVITY **RESEARCH, DEVELOPMENT, TEST & EVALUATION, NAVY/BA 5**	R-1 ITEM NOMENCLATURE MINE DEVELOPMENT/0604601N

IMPROVED SLMM PROGRAM SCHEDULE

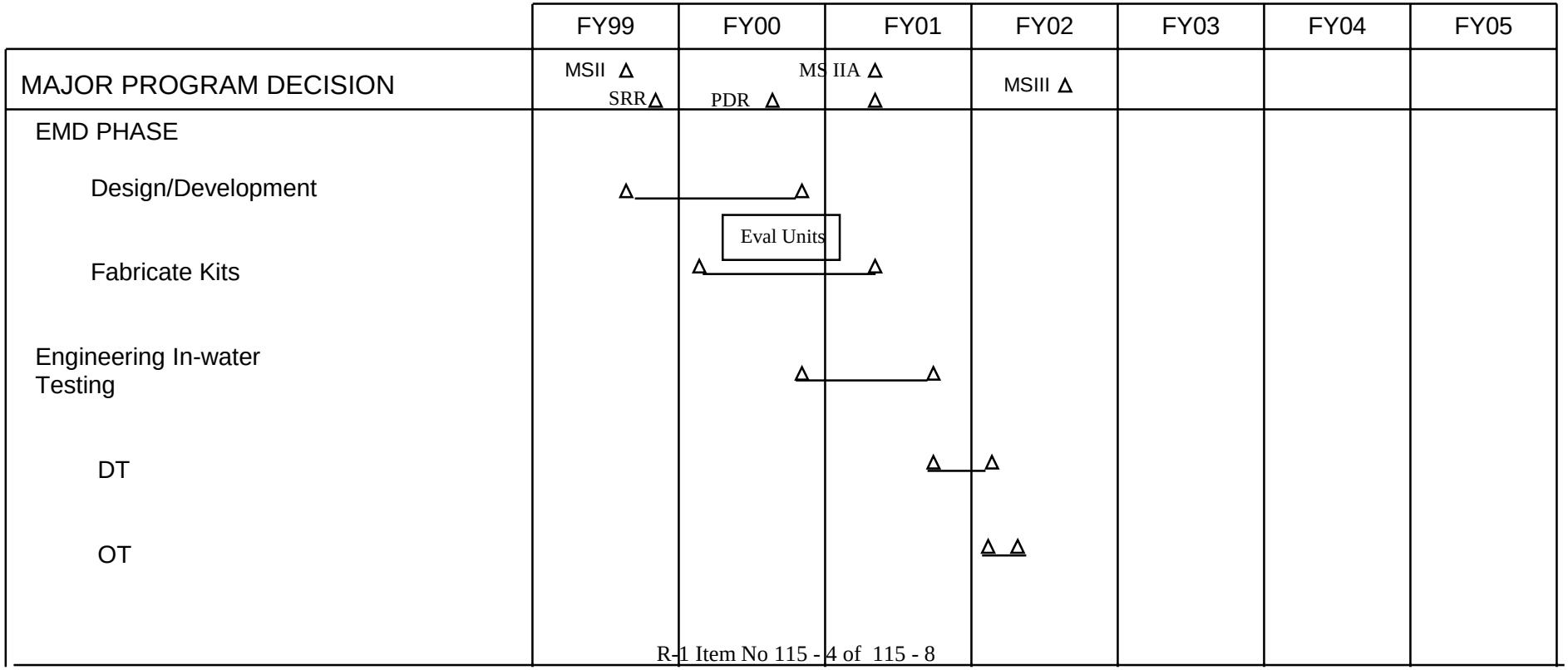

Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
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Technical: None.

C. Other Program Funding Summary :($ in Millions)

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
ISLMM WPN #322100	0.0	5.9	9.8	8.8	0.0	0.0	0.0	24.5

Related RDT&E:

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
Royal Australian Navy	3.5	4.0	5.0	0.0	0.0	0.0	0.0	12.5
10 USC 2350(a)	3.0	2.0	1.0	0.0	0.0	0.0	0.0	6.0

D. Acquisition Strategy:

The USN and RAN will cooperatively design ISLMM. The US Navy laboratories (NUWC, Newport RI/NSWC Panama City Fl), will team with qualified contractors to manufacture the kits to make the EMD models. NUWCDIVKPT, the USN depot for the MK48, will assemble the ISLMMs/EMD models for All up Round (AUR) testing.

Using existing hardware to the greatest extent possible, NSWC Coastal Systems Station will team with other Navy laboratories and hardware contractors to design and develop the LSM. They will utilize the existing CAPTOR case and active acoustic source, and the shallow-water variant of the MK 46 torpedo. New developments will include an high-frequency acoustic (receiver) array, a short-range two-way remote control system, and a high-frequency passive/active target tracking subsystem. Extensive modeling and simulation will be used throughout to reduce the need for expensive in-water testing as much as possible.

E. Schedule Profile: See Attached.

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/BA-5	PROGRAM ELEMENT NAME AND NUMBER MINE DEVELOPMENT/0604601N	PROJECT NAME AND NUMBER MINE DEVELOPMENT/Q0267

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	RCP	NUWCDIVNPT – Newport, RI NSWC, CSS – Panama City, FL	0.0	0.0	N/A	1.8	N/A			CONT.	CONT.	N/A
Ancillary Hardware Development												
Systems Engineering	WR	NUWCDIVNPT – Newport, RI NSWC, CSS – Panama City, FL	0.0	0.0	N/A	.9	N/A			N/A	.N/A	N/A
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development						2.7				CONT.	CONT.	N/A
Remarks:												
Development Support Equipment												
Software Development	WR	NUWCDIVNPT – Newport, RI NSWC, CSS – Panama City, FL	0.0	0.0	N/A	0.1	10/1			CONT.	CONT.	N/A
Training Development												
Integrated Logistics Support	WR	NUWCDIVNPT – Newport, RI NSWC, CSS – Panama City, FL	0.0	0.0	N/A	0.2	10/1			CONT.	CONT.	N/A

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/BA-5	PROGRAM ELEMENT NAME AND NUMBER MINE DEVELOPMENT/0604601N	PROJECT NAME AND NUMBER MINE DEVELOPMENT/Q0267

Configuration Management												
Technical Data												
GFE												
Subtotal Support						0.3				CONT.	CONT.	N/A
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	Fy00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NUWCDIVNPT – Newport, RI NUWCDIVKPT – Keyport, WA NSWC, CSS – Panama City, FL	0.0	0.0	N/A	0.3	N/A			CONT.	CONT.	N/A
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E						0.3				CONT.	CONT.	N/A
Remarks:												

Contractor Engineering Support												
Government Engineering Support												
Program Management Support	WR		0.0	.015	N/A	0.0	N/A		N/A	CONT.	CONT.	N/A
Program Management Personnel												
Travel												

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APPROPRIATION/BUDGET ACTIVITY RDT&E,N/BA-5	PROGRAM ELEMENT NAME AND NUMBER MINE DEVELOPMENT/0604601N	PROJECT NAME AND NUMBER MINE DEVELOPMENT/Q0267

Labor (Research Personnel)												
Overhead												
Subtotal Management				.015		0.0				CONT.	CONT.	N/A
Remarks:												
Total Cost				.015		3.3				CONT.	CONT.	N/A
Remarks:												